

Stationary Concentrator Daylighting System



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Glint Photonics Inc.
Chris Gladden – Daylighting Lead

Stationary Concentrator Daylighting System

Glint Photonics Inc.

- Leading development of innovative optical devices
 - Advanced materials and device designs
 - Unique IP in self-tracking solar concentrators, tunable IR optical devices, and advanced luminaires
- Technical leadership:
Over 60 years combined experience in materials and device technologies, product development, startup companies
- Expertise:
Engineering staff from a variety of technical fields. Expertise in optical device design, optoelectronics, process development, simulation, optical test
- Facilities:
Large mixed lab, office, light manufacturing and warehouse space. Located in Burlingame, CA.
- History:
Founded in October 2010. Over \$7 million in government funding.



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What if all of our interior spaces were lit with natural daylight?

Why should we have to turn the lights on when it's sunny outside?

- Lighting buildings with artificial light during daylight hours wastes energy, generates heat, and costs money, even when using the most efficient sources.
- If we could direct natural sunlight into interior spaces we could save energy, improve comfort and productivity with full spectrum natural light, and save money.
- 40%-70% of lighting energy use could be offset by a properly designed daylighting system, depending on location.
- Direct use of daylight is much more efficient than solar panels driving LEDs.

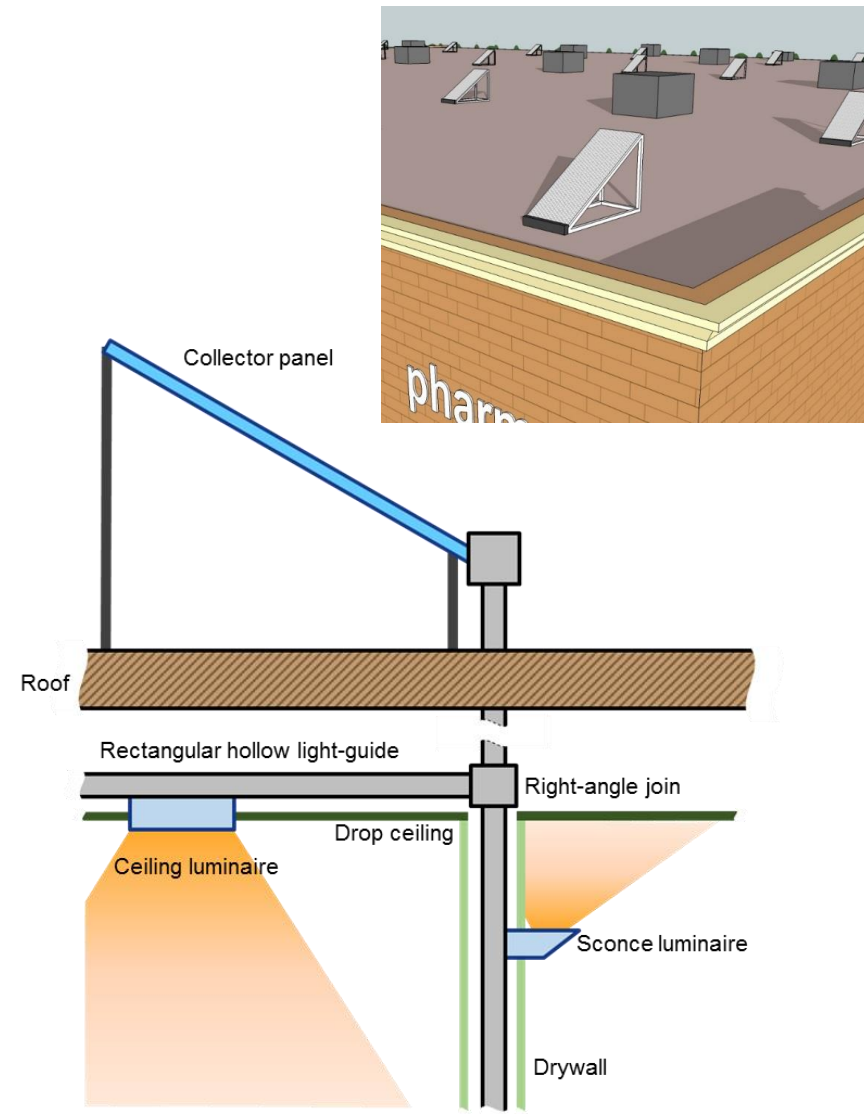
Existing daylighting products do not meet market demands

- Windows and skylights provide ample daylight near the building shell, but compromise security and building thermal management and can't be easily retrofit.
- Tubular daylighting devices can delivery light deeper but have limited flexibility in routing and have limited light output based on roof penetration size.
- Existing concentrator daylighting products are prohibitively expensive and require cumbersome trackers to be installed on rooftops.

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Technology Solution

- Thin, flat, stationary collector panel mounted on roof or building façade
- Hollow light-guide can be routed through walls and plenums as desired, up to 30 meters from collector
- Gathers sunlight at angles $>60^\circ$, providing >8 hours of daylight
- No external power needed, dimmable on demand or through building automation
- Use in office buildings, industrial facilities, retail stores, schools, hospitals, museums, homes.
- Provides many advantages over tube skylights
 - 1.75x more light delivered per unit with 6.5x smaller roof penetration at similar cost
 - More flexible internal routing and more attractive luminaire options

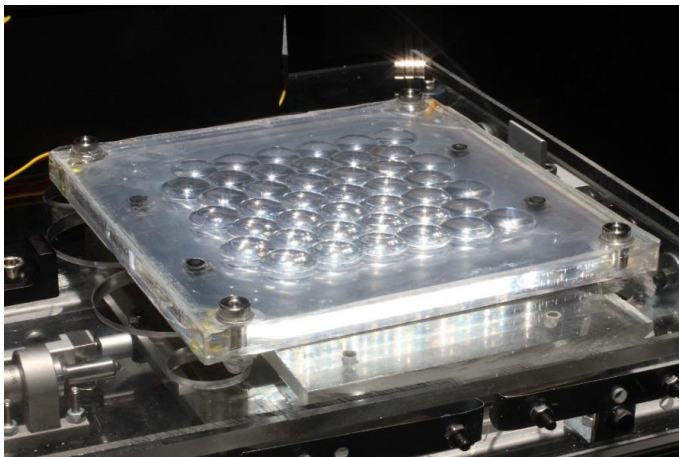


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Advantage, Differentiation, and Impact

Daylighting system	Routing capability	Roof penetration area (sq ft)	Peak lumens	Cost
Skylight in drywall shaft	None	8.00	30,000	\$2,500
Tubular daylighting device	Limited	1.10	8,000	\$300
Concentrator with fiber optics	Flexible	0.05	4,000	\$10,000
Glint daylighting device	Flexible	0.17	13,000	\$400

The Glint Daylighting Device provides significant cost and performance advantages over incumbent technology. The concentration allows more light to be delivered through a smaller roof penetration, reducing installation cost and increasing routing flexibility.



prototype panel under test

- Current panels perform as modeled with 18 in² collector
- Next generation panels under construction will deliver higher efficiency with 170 in² collector area
- Key milestones:
 - Demonstration of next generation panel
 - Demonstration of delivery optics
 - Panels survive environmental testing and accelerated aging
 - Installation of first pilot project

Thank You

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